



RADCALC for WINDOWS¹

Applications in the Performance of Safety Analyses

Radcalc for Windows¹ Version 2.01 (**Radcalc**) is a user-friendly software program maintained by Waste Management Federal Services, Inc., Northwest Operations (WMNW) for the National Transportation Program, Department of Energy (DOE). It is used for transportation and packaging applications in the shipment of radioactive waste materials. Among its applications are: the classification of waste per the U.S. Department of Transportation (DOT) regulations; the calculation of decay heat and daughter products; and the calculation of the radiolytic production of hydrogen gas.

Radcalc calculates the radiolytic production of hydrogen gas as follows: the sum of the disintegrations per second per decay type for a specified period of time is multiplied by the average energy for the associated decay type, by the associated material-specific G value, and by an energy absorption factor. The products are summed for all radionuclides present and multiplied by a conversion factor. The program reports:

- Hydrogen gas generation rate (cm³/hr)
- Volume percent hydrogen gas in a specified period of time or time to reach a volume percent of hydrogen gas
- Partial pressure of the hydrogen
- Total pressure of the hydrogen gas and air

Other **Radcalc** features include:

- Calculation of the activity and daughter products of radionuclides
- A data library of over 280 radionuclides based on ENDF/B-VI

- Calculation of decay heat
- Extensive testing, verification and validation

Radcalc includes many user-friendly features for input and manipulation of the source term.

- The user can input activity in units of becquerels or curies or convert between units.
- The source term can be multiplied by a factor to increase or decrease activity.
- The source term can be imported from another file or exported to a file.
- **Radcalc** writes a data file that includes information on activity, specific activity, decay heat, A1 / A2 values, and totals.

The DOT classification calculations are described in detail in the handout "Applications in the Transportation of Radioactive Materials" and in the software manuals.

Radcalc is available free of cost to the DOE community from WMNW. Call Janet McFadden (509-376-0610) or Tino Romano (509-373-0371) to request a copy. You can contact us by e-mail at janet_mcfadden@wmnsnw.com or at tino_romano@wmnsnw.com. WMNW offers two training modules on **Radcalc**, Module 1: DOT Classification with **Radcalc** and Module 2: Hydrogen Gas Generation Calculations with **Radcalc**. Contact us for further information.

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